REMARKS

Claims 1-3, 5, 8-11 and 13-20 stand rejected, while claims 4, 6, 7 and 12 merely have been objected to as depending from a rejected claim. Claims 1-20 remain pending.

Claims 1-3, 5, 8-11 and 13-20 were rejected under 35 U.S.C. §102 as being anticipated by Christensen.

The present invention is an improvement of the device described in that earlier 6,650,111 patent of present inventor Timothy A. Christensen. Note that the present invention describes the same fundamental operation of the proximity sensor with the addition of the signal normalization process shown in Figures 5 and 6. It is this process that is unique to the claims under examination.

With reference to claim 1, that novel signal normalization provides a performance reference defining a relationship between a sensor signal parameter and a characteristic of the object to be detected is determined. A function then is defined that specifies deviation of performance of the particular proximity sensor from the performance reference. Thereafter, operation of the proximity sensor produces a sensor signal which indicates whether the object is proximate to the proximity sensor and the function is employed to normalize that sensor signal. The normalized the sensor signal is compared to a defined threshold to determine whether an object is present.

Nothing in inventor Christensen's earlier patent teaches deriving a function that specifies the performance deviation of the proximity sensor from a performance reference and then employing that function to normalize a signal that indicates object proximity. The rejection of claim 1 cited column 4, lines 21-38 as describing both the "performance

reference" and the claimed "function". However, that passage describes how the resonant circuit 43 produces an exponentially decaying sensor signal (Figs. 4-6) which indicates whether the object is proximate to the proximity sensor. Therefore this part of the patent describes neither the "performance reference" nor the "function", but instead describes production of the "sensor signal" referred to in the claims. Although the resonant circuit receives an excitation signal from drive circuit 27, that excitation signal does not indicate whether the object is proximate to the proximity sensor and thus does not correspond to the claimed "sensor signal" that is normalized by the "function".

In fact, nothing in the prior Christensen patent calls for normalizing the sensor signal produced by the sensor described in its Detail Description of the Invention. To find normalization, the rejection cited that patent's Background of the Invention section which mentions the drawback of even earlier proximity sensors which were normalized using ferrous targets and a technician manually adjusting the sensor circuit. Nothing in the Background of the Invention section describes performing normalization using a function that was derived by providing a performance reference or specifying a deviation of the actual performance of a proximity sensor to the performance reference. Nor is there any mention of how the circuit of the prior Christensen proximity sensor is normalized. As a consequence, this reference to normalization of prior proximity sensors does not teach the normalization method described and claimed in the present application.

The rejection further contends that the function specified in dependent claim 3 is defined in column 5, lines 10-20 of the Christensen patent. This passage merely describes a physical effect in which a ferrous material alters the Q-factor of the resonant circuit.

Although the reference employs that effect to produce a sensor signal that indicates proximity of metal objects, its does not describe deriving a function which characterizes that effect nor normalizing the resultant sensor signal with such a function.

With respect to dependent claims 5, 13 and 18 the office action has mischaracterized the quality factor Q of a resonant circuit as being a "gain factor". In the patent's sensor, the Q factor of the resonant circuit varies depending on the presence or absence of a metal object, thereby altering the exponential decay of the output signal from that resonant circuit to indicate an object's presence. In contrast, the claimed gain factor is the function by which the results of processing that resonant circuit output signal are altered to produce a normalized signal.

Claims 9, 15 and 20 specify that a reference distance value is defined by obtaining that value from another proximity sensor. The reference distance value is used to define a threshold for the sensor signal processing. Nothing in the earlier Christensen circuit, much less the passage specifically cited in the rejection, mentions obtaining a reference distance value from another sensor. That cited passage describes how two closely placed proximity sensors control the intervals at which their resonant circuits are excited to avoid adversely affect each other (column 8, lines 5-9). Nothing in that cross-talk avoidance mechanism relates to defining a reference distance value.

Independent claim 10 is patentable for the same reasons as claim 1. In addition claim 10 calls for operating the proximity sensor to produce a given numerical value and then employing the derived function to normalize the given numerical value to produce a normalized value. At best, the Christensen patent describes the physics of a resonant

circuit and its Q-factor that produce the given numerical value, however that patent does not mention normalizing the given numerical value nor doing so in the claimed manner.

Independent claim 16 is patentable for the reasons stated above regarding claim 1 and claim 17 is not taught by the earlier Christensen patent on the same basis as claim 10.

Claim 18 calls for multiplying the signal count by a gain factor to produce a normalized signal. However nothing in the Christensen patent teaches multiplying the count. The rejection cited the resonant circuit Q-factor as a gain factor. However, the Q-factor is the characteristic of the resonant coil that produces the signal pulses that are counted and does not thereafter multiply that count.

Conclusion

Therefore the Office Action has failed to show how the Christensen patent teaches the present method for operating a proximity sensor. As a consequence, claims 1-3, 5, 8-11 and 13-20 are not anticipated under 35 U.S.C. §102. Reconsideration and allowance of the present application are requested.

Respectfully submitted,
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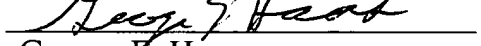
By: 
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